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PENSOFT

Discovery of *Lasioglossum albescens* (Smith, 1853) (Hymenoptera, Halictidae) from the Kinmen Islands, Taiwan

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Abstract
Lasioglossum albescens (Smith, 1853) is recorded from Taiwan for the first time. The specimens were collected in the Kinmen Islands, several kilometers east of Xiamen, in Fujian, China. This species is distinguished from the other Taiwanese *Lasioglossum* (*Ctenonomia*) species by a combination of male clypeus black, mesoscutum with relatively sparse punctures between parapsidal and median lines in both sexes, and first metasomal tergum without distinct punctures and with distinct tessellation over entire surface in both sexes.

Keywords
Distribution, eastern Asia, new record, Oriental Region.

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Introduction

The cosmopolitan bee genus *Lasioglossum* Curtis, 1833 (Hymenoptera, Halictidae) includes approximately 1,800 species worldwide (Ascher and Pickering 2020). One of them, *Lasioglossum* (*Ctenonomia*) *albescens* (Smith, 1853), has been recorded or listed from various countries in Southern and Southeastern Asia (Fig. 1): Pakistan (Ebmer 1998), India (e.g., Smith 1853, 1879; Matsumura and Sakagami 1971), Nepal (Matsumura and Sakagami 1971), Sri Lanka (Strand 1913a; Wijesekara 2001), Bangladesh (Tadauchi and Alam 1993), Myanmar (Bingham 1897), Thailand (Cockerell 1937; Sakagami 1968; Matsumura and Sakagami 1971), Cambodia (Sakagami 1968; Matsumura and Sakagami 1971); Malaysia (Matsumura and Sakagami 1971), Singapore (Ascher et al. 2019), Indonesia (Strand 1910), Philippines (Ashmead 1904; Strand 1910), and China (Zhang 2017). The biology of this species has been reported by Batra (1966), Sakagami (1968), and Matsumura and Sakagami (1971). According to their papers, the biological information can be summarized as follows: nests are built on sparsely grassy slope and sometimes forming nest aggregation; nest structure is the type II or IIIa of Sakagami and Michener (1962); social structure seems to be communal; and it is estimated that the brood-rearing activities has two peaks at highlands of Nepal, in spring and autumn.

This species is divided into three subspecies: *L. albescens* s. str., *L. albescens sepulchrale* (Cameron, 1897), and *L. albescens iwatai* (Sakagami, 1968). According to Sakagami (1968), *L. albescens sepulchrale* is usually

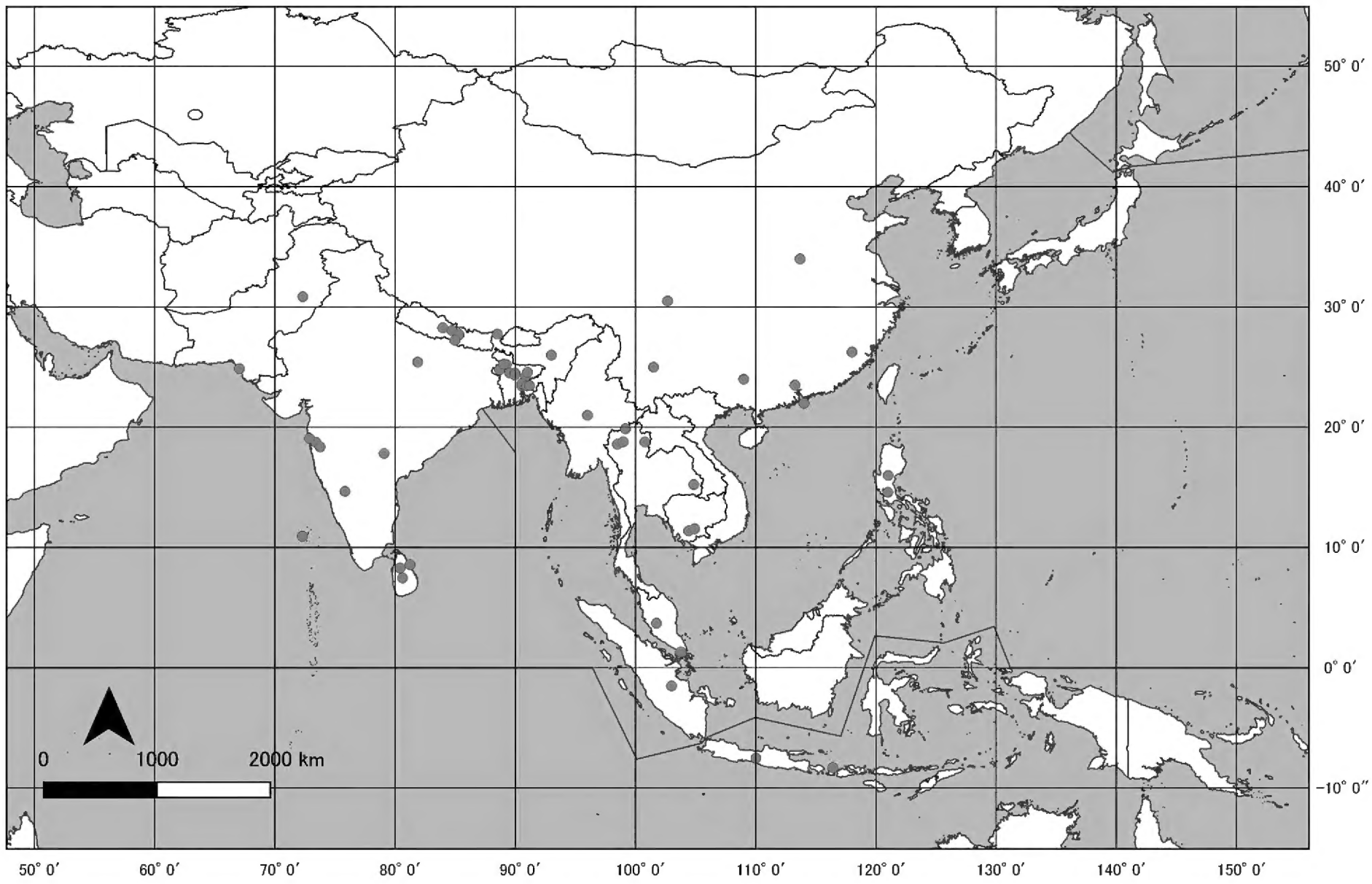

Figure 1. Distribution map of *Lasioglossum albescens* in Southern and Southeastern Asia.

found in mountainous areas, while *L. albescens* s. str. more from plains and hilly areas, and *L. albescens iwatai* inhabits the lowlands of Thailand and Cambodia (Sakagami 1968). However, separation of subspecies is often difficult because of a remarkable and continuous variability of the character states (Matsumura and Sakagami 1971).

In the course of our taxonomic study of Taiwanese bees, we found *L. albescens* from the Kinmen Islands, Taiwan, for the first time. Four species of *Lasioglossum* (*Ctenonomia*) are currently recorded from Taiwan: *L. halictoides* (Smith, 1858), *L. kumejimense* (Matsumura & Uchida, 1926), *L. taihorine* (Strand, 1914), and *L. vagans* (Smith, 1857) (Strand 1910, 1913b, 1914; Cockerell 1911; Blüthgen 1926; Murao et al. 2009). In this paper, we report the first records of *L. albescens* from Taiwan, with discussion on morphological variation of the specimens examined.

Methods

The specimens of *Lasioglossum albescens* examined in the present study are deposited at the Forest Arthropoda Collection of Taiwan, in the Taiwan Forestry Research Institute. Specimens were identified based on Zhang (2017) and by comparison with identified specimens preserved in the Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka, Japan, and the Museum of Nature and Human Activities, Hyogo, Japan.

Abbreviations of measurements used in the text are as follows: AOD = antennocular distance (shortest distance between outer margin of antennal socket and inner margin of compound eye); BL = body length (from antennal base to tip of pygidial plate); CAL = clypeoalveolar distance (between lower margin of antennal socket and lower margin of supraclypeal area in frontal view); CPL = clypeal length (between upper and lower margins of clypeus in frontal view); d = diameter; EL = eye length; EW = eye width (maximum length and width of the compound eye); Fn = nth antennal flagellomere; FnL = length of nth flagellomere (measured along the ventral surface); FnW = width of nth flagellomere (measured from dorsal and ventral surfaces of flagellomere); GW = genal width (maximum width of the genal area when seen in lateral view); HL = head length (from top of vertex to lower margin of clypeus); HW = head width (between outer margins of compound eyes in frontal view); IAD = interantennal distance (between inner margins of antennal socket); IOD = interocellar distance (between lateral ocelli); IS = interspace between punctures (e.g., IS 0.5 d means ½ of the diameter of a puncture); LOD = lower interorbital distance; MNL = metanotal length; MOD = maximum interorbital distance; MPL = metapostnotal length; MsW = maximum mesosomal width; MtW = maximum metasomal width; OCD = ocelloccipital distance (shortest distance between margins of lateral ocellus and vertex when seen in upper view); OOD = ocellocular distance (shortest distance between lateral ocellus and inner margin of compound eye); PP = punctures; SCL = mesoscutellar length; Sn = nth metasomal sternum; SPL = scape length (a straight line from base to tip of scape); Tn = nth metasomal tergum; UOD = upper

interorbital distance; WL = wing length (length of fore wing from the apical point to the base including tegula)..

Distribution maps (Figs 1, 2) were made by QGIS 3.6 (QGIS Development Team 2020) using map data downloaded from Natural Earth (https://www.naturalearthdata.com/). The point data of Figure 1 are based on the following papers or databases: Bingham (1897), Ashmead (1904), Strand (1910), Cockerell (1937), Sakagami (1968), Matsumura and Sakagami (1971), Wijesekara (2001), Tadauchi and Alam (1993), Ascher et al. (2019), Ascher and Pickering (2020), and Entomology Database, BeeFTadauchi (http://konchudb.agr.agr.kyushu-u.ac.jp/beeftadauchi/). The localities extracted from these papers were geocoded by GeoNames (https://www.geonames.org/).

Results

Family Halictidae Thomson, 1869
Genus *Lasioglossum* Curtis, 1833
Subgenus *Ctenonomia* Cameron, 1903

***Lasioglossum* (*Ctenonomia*) *albescens* (Smith, 1853)**
Figures 2, 3

New records. TAIWAN • 1 female, 3 males; Kinmen Co., Yingkeng, Great Kinmen; 24°29′41.92″N, 118°25′05.36″E; 1 Oct. 2014; S.S. Lu and W.C. Yeh leg.; crop field; TFRI.

The Kinmen islands are composed of Great Kinmen and Lesser Kinmen, the former is where *L. albescens* was collected. The collecting site in Yingkeng of Great Kinmen is a crop field, located near Mt. Taiwu, and mainly cultivated with the *Sorghum* Moench, 1794. *Lasioglossum* (*Leuchalictus*) *formosae* (Strand, 1910) was collected simultaneously from the same site and it seems to be more common in Great Kinmen than *L. albescens*.

Identification. Measurements (mm). Female (*n* = 1). BL = 9.00, WL = 7.08, HL = 2.40, HW = 2.53, IOD = 0.43, OOD = 0.39, OCD = 0.33, UOD = 1.50, MOD = 1.70, LOD = 1.26, IAD = 0.22, AOD = 0.46, CAL = 0.46, CPL = 0.50, EL = 1.77, EW = 0.67, GW = 0.67, SPL = 0.93, F1L = 0.13, F2L = 0.13, F3L = 0.13, F2W = 0.17, MsW = 3.00, SCL = 0.60, MNL = 0.37, MPL = 0.43, MtW = 2.93

Male (*n* = 1). BL = 7.67, WL = 6.25, HL = 2.23, HW = 2.00, IOD = 0.41, OOD = 0.33, OCD = 0.22, UOD = 1.20, MOD = 1.35, LOD = 0.98, IAD = 0.24, AOD = 0.33, CAL = 0.37, CPL = 0.50, EL = 1.47, EW = 0.60, GW = 0.60, SPL = 0.50, F1L = 0.15, F2L = 0.24, F3L = 0.24, F2W = 0.17, MsW = 2.47, SCL = 0.57, MNL = 0.30, MPL = 0.43, MtW = 2.20.

Lasioglossum albescens can be distinguished from the other four *L.* (*Ctenonomia*) species occurring in Taiwan by a combination of the following characteristics: male clypeus black, mesoscutum with relatively sparse PP between parapsidal and median lines (Fig. 3D) in

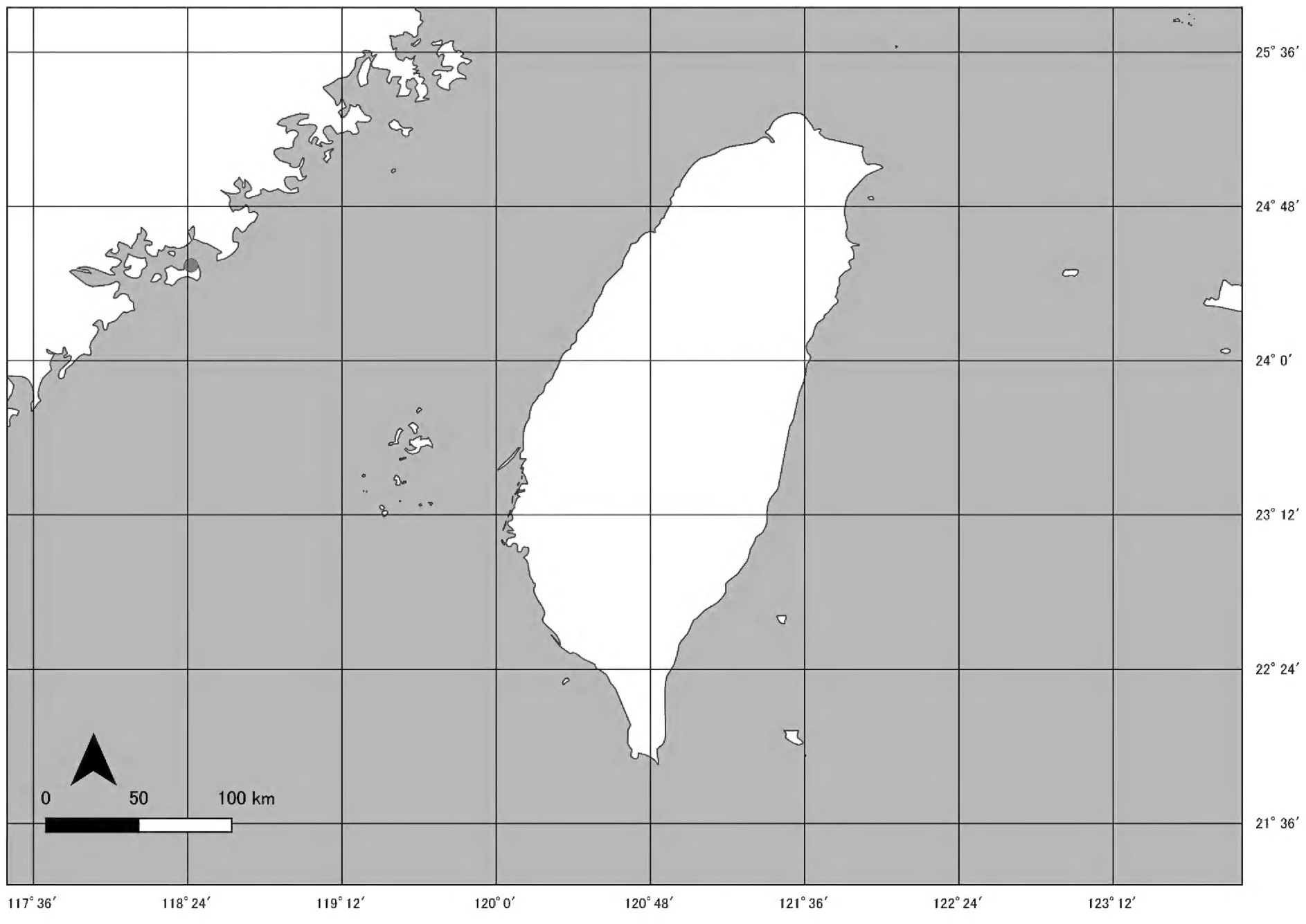

Figure 2. Distribution map of *Lasioglossum albescens* in Taiwan.

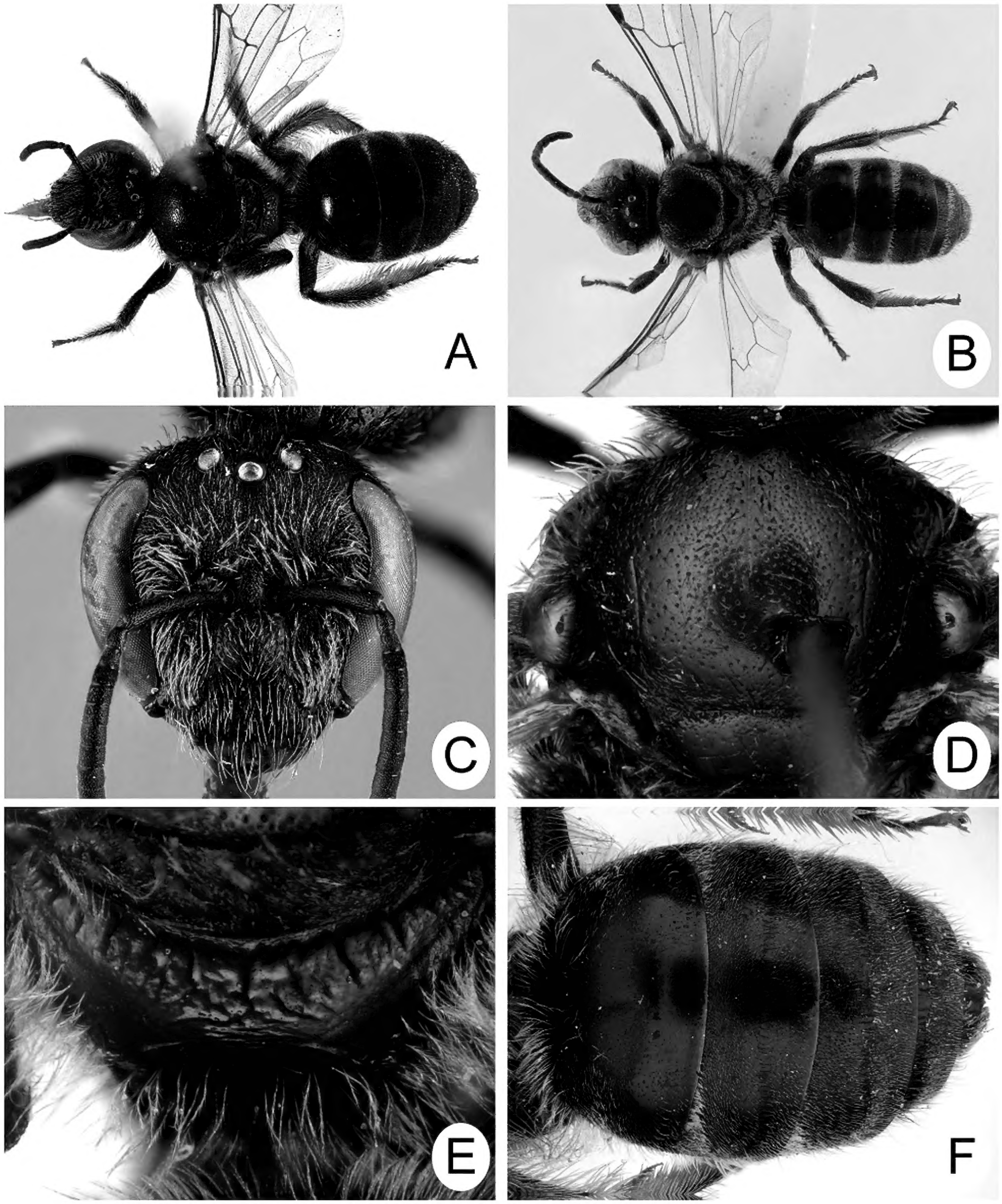

Figure 3. *Lasioglossum albescens*. **A, B.** General habitus. **C.** Head in frontal view. **D.** Mesoscutum. **E.** Metapostnotum. **F.** Metasomal terga. **A, C–F.** Female. **B.** Male.

both sexes, and T1 without distinct PP and with distinct tessellation over entire surface in both sexes.

Discussion

Based only on the material examined, it is difficult to determine whether the Kinmen's specimens belong to *L. albescens* str. or *L. albescens sepulchrale*. The female specimen collected from Yingkeng shows the following characteristics: 1) head (Fig. 3C) slightly longer than wide (ratio of HL / HW 1.12); 2) mesoscutum (Fig. 3D) with relatively sparse PP between parapsidal and median lines (maximum IS = 4 d); 3) mesoscutum weakly shiny, IS with weak tessellation; 4) metapostnotum of propodeum (Fig. 3E) with relatively sparse ridges, IS of ridges shiny and smooth; 5) oblique and lateral carinae on posterior surface of propodeum complete but not strong; 6) wing veins pale brown; 7) T1 (Fig. 3F) basally with thin

and white hair patches. According to Blüthgen (1926), Sakagami (1968), and Matsumura and Sakagami (1971), the characteristics 2 and 4 are shared with *L. albescens sepulchrale*, but the 5–7 are indicative of *L. albescens* s. s.tr. The sculpture of mesoscutum seems to be intermediate between this two subspecies .

More than 175 species of bees are known from Taiwan (Yeh, unpublished data) and about half of them are endemic to the island. However, no researcher has ever reported the bee fauna of the Kinmen Islands, located several kilometers east of Xiamen, in Fujian, China (Fig. 2). From a biogeographical viewpoint, the Kinmen islands may share more similar bee fauna with Mainland China than Taiwan, which is approximately 200 km away. This is evidenced not only by the present record of *L. albescens* but also by two vespoid wasps recently reported from Lesser Kinmen (= Leiyu), namely *Vespa tropica* (Linnaeus, 1758) and *Scolia azurea* (Christ, 1791) (Chang 2017). It can be expected that further investigation on the bee fauna of the Kinmen islands will reveal more species that do not occur on the main island of Taiwan.

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Authors' Contributions

SSL and WCY collected specimens. RM identified specimens. All authors have read and approved the submitted manuscript.

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